CHAPTER 6. UPDATE OF AIRPORT PLANS

This section of the report describes a series of airport development options, or "concepts," that satisfy demands for future aviation activity levels. An evaluation of the alternative concepts was accomplished through meetings with Aviation Department, local airport users, and the FAA; and with the comments of these groups, a preferred airport development concept was selected. This final concept is detailed on updated Airport Layout Plan drawings and in a text format.

a. Concepts

General Description of Airport Development Concepts

Concepts for the future development of the Deer Valley Airport have been separated into two general components for purposes of this study - airfield concepts and hangar development concepts. Each of these components is analyzed separately and the preferred airfield and hangar alternatives are subsequently combined and adjusted as a final airport development concept.

Five different airfield concepts were identified, as follows

o Airfield Concept A-1 (Figure 6-1)

- extend Runway 7R-25L to 8200 feet (1300-foot extension west, 1600-foot extension east); provide non-precision clear zone on west end of runway (which will extend 910 feet across 19th Avenue), visual clear zone on east end.

- extend Runway 7L-25R to 4500 feet (450 feet west, 250 feet east); add new exit taxiways.

o Airfield Concept A-2 (Figure 6-2)

- extend Runway 7R-25L to 8200 feet (1300-foot extension west, 1600-foot extension east); displace 7R threshold by 910 feet to accommodate non-precision clear zone on airport property; provide visual clear zone on Runway 25L.

- extend Runway 7L-25R to 4500 feet, with 700-foot extension to west; add exit taxiways to the runway.

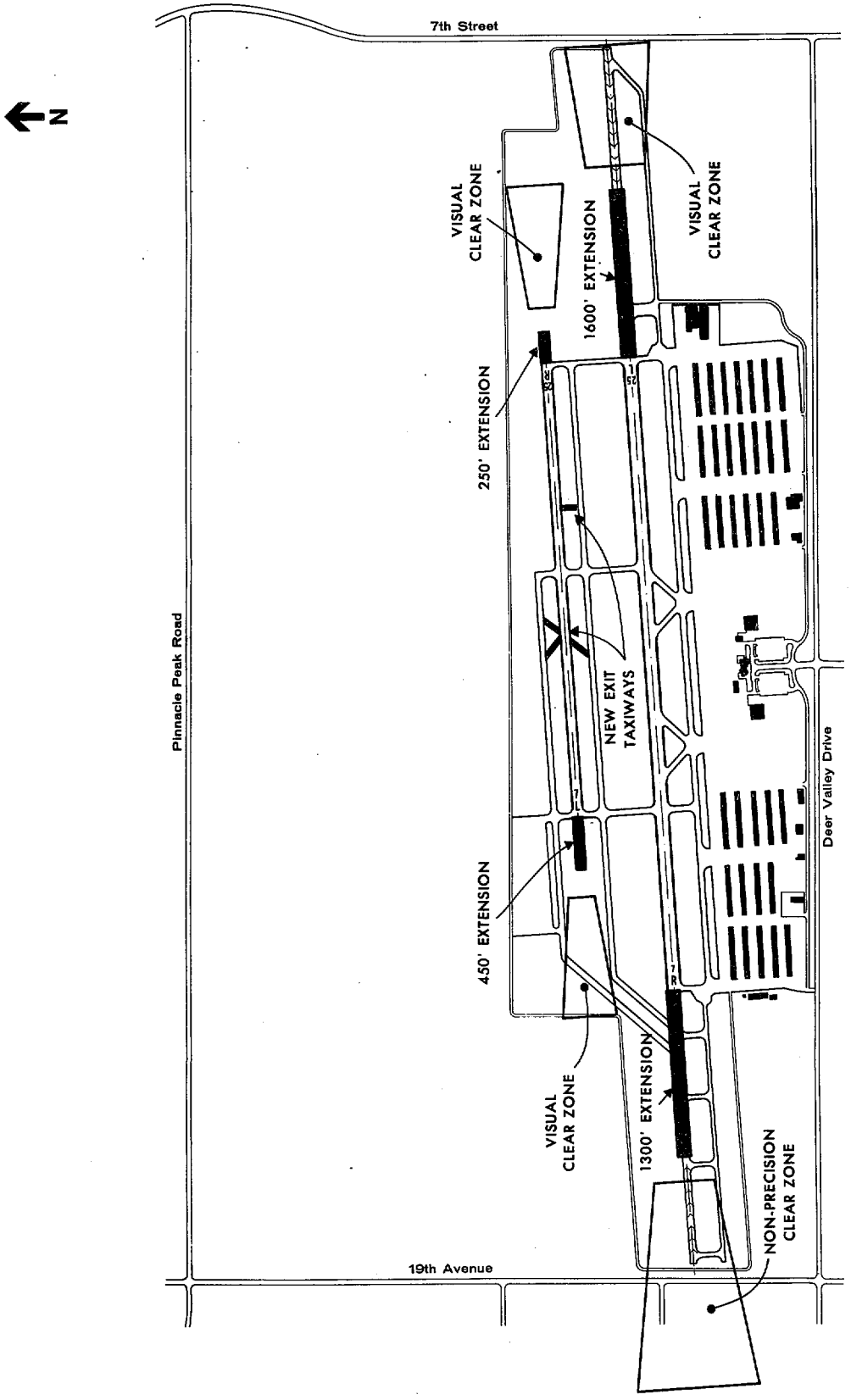
o Airfield Concept A-3 (Figure 6-3)

- extend Runway 7R-25L to 8200 feet (1300-foot extension west, 1600-foot extension east); displace 7R threshold by 910 feet to accommodate non-precision clear zone on airport property; displace 25L threshold by 930 feet to keep non-precision clear zone on airport property.

AIRFIELD CONCEPT A-1

FIGURE 6-1

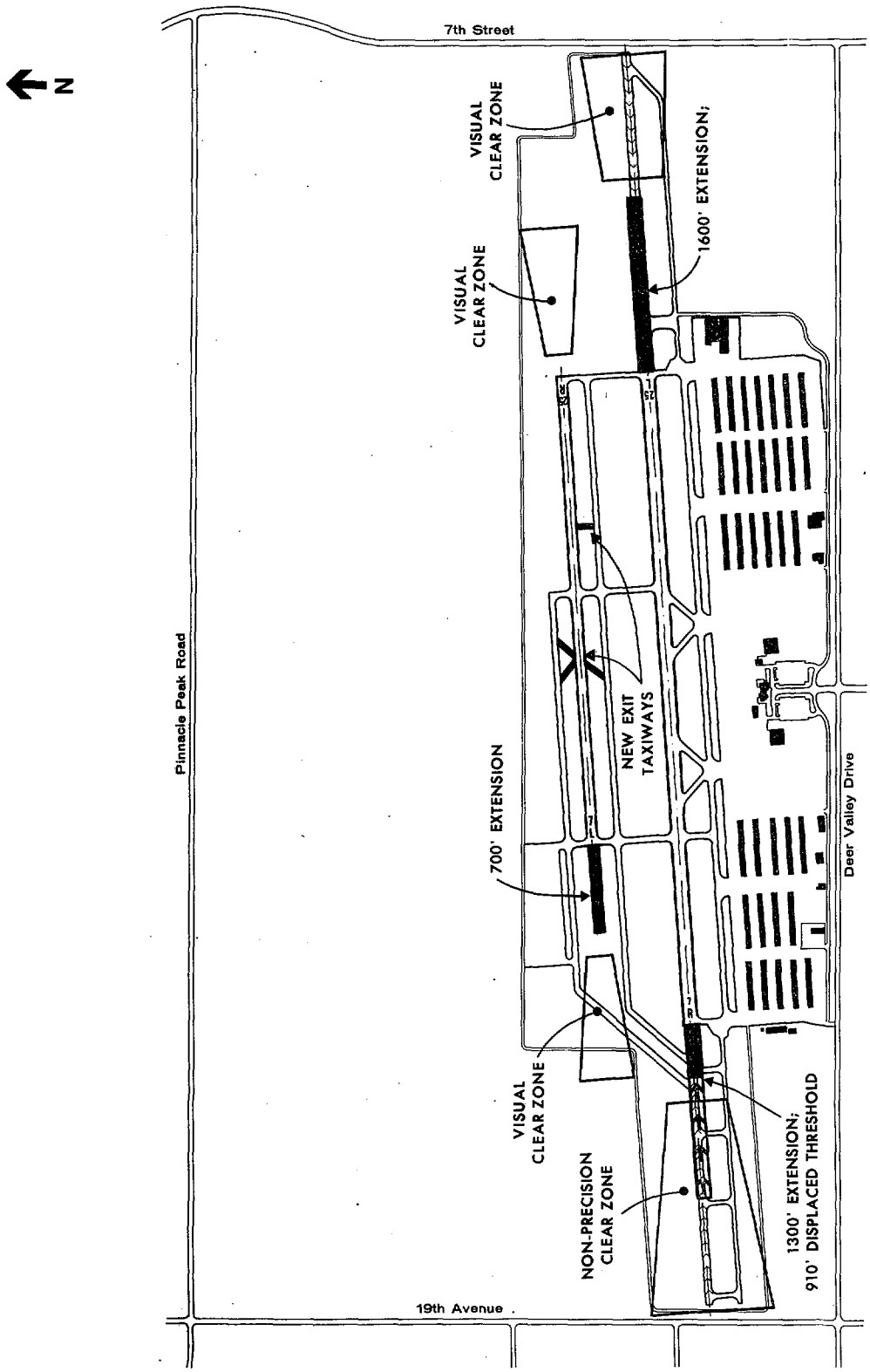
PHOENIX–DEER VALLEY MUNICIPAL AIRPORT



AIRFIELD CONCEPT A-2

FIGURE 6-2

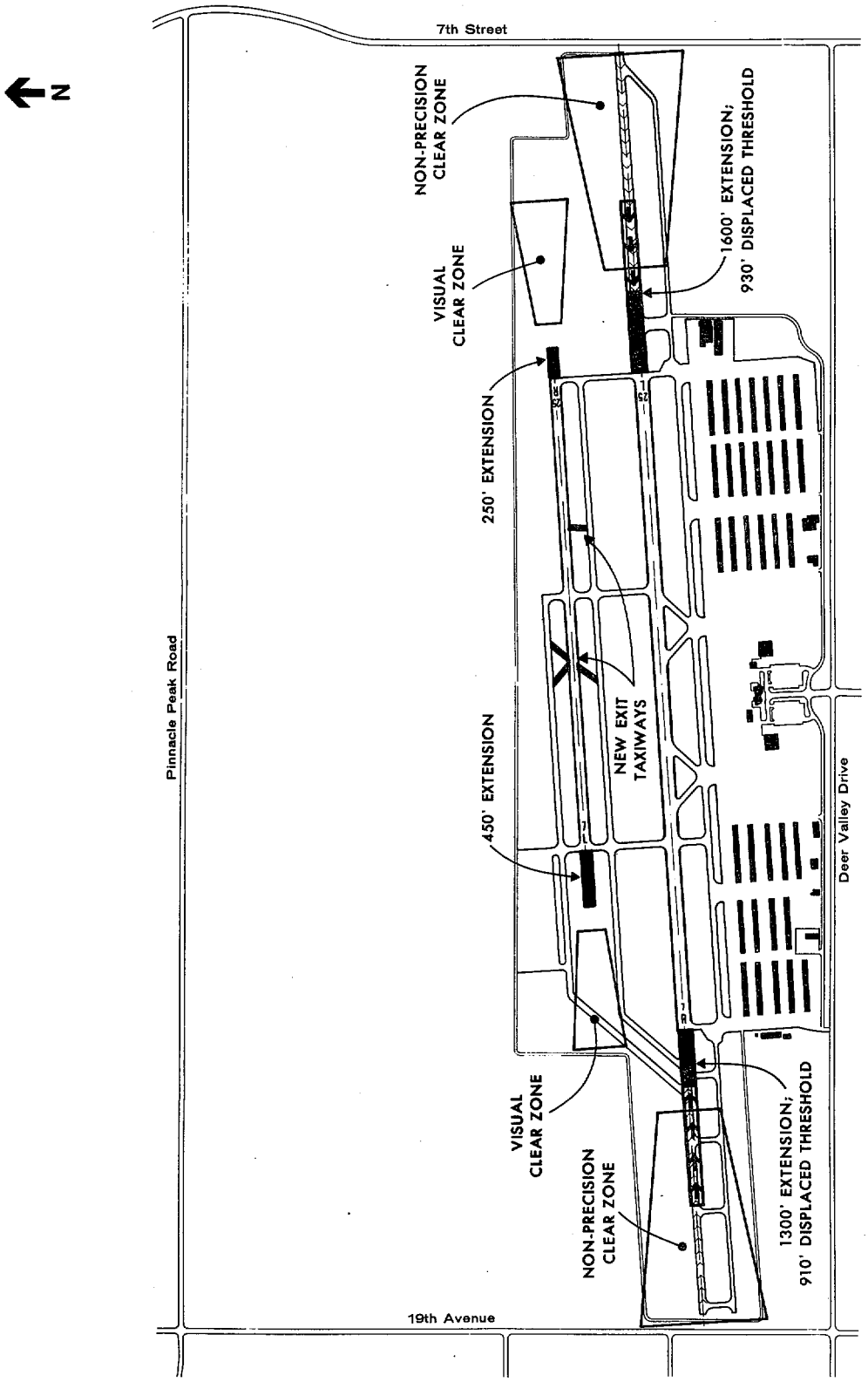
PHOENIX–DEER VALLEY MUNICIPAL AIRPORT



AIRFIELD CONCEPT A-3

FIGURE 6-3

PHOENIX–DEER VALLEY MUNICIPAL AIRPORT



- extend Runway 7L-25R to 4500 feet, with 450-foot extension to west and 250-foot extension to east; add exit taxiways to the runway.

o Airfield Concept B (Figure 6-4)

- extend Runway 7R-25L to 7200 feet (1400-foot extension east and a 500-foot extension west); provide non-precision clear zone on west end, visual clear zone on east end without displaced thresholds.

- extend Runway 7L-25R to 4500 feet, with 700-foot extension to west; add exit taxiways to the runway.

o Airfield Concept C - No Build

Separate from development of the airfield concepts, concepts were developed for the location of future hangar and FBO facilities. Two hangar development options were identified.

o Hangar Concept 1 (Figure 6-5)

- purchase 175 acres north of the airport, and develop all new T-hangars and FBO facilities on this new acreage (new facilities can be organized in several different layouts).

o Hangar Concept 2 (Figure 6-6)

- purchase approximately 60 acres in southeast corner, and 30 acres in southwest corner of airport. Develop T-hangars and FBO facilities in both areas.

In the section following, an evaluation of the airfield concepts and hangar development concepts is presented.

Evaluation of Airfield Concepts

The airfield concepts were initially evaluated with respect to three principal factors:

1. operational efficiency for existing and future airport users,

2. capital costs, and

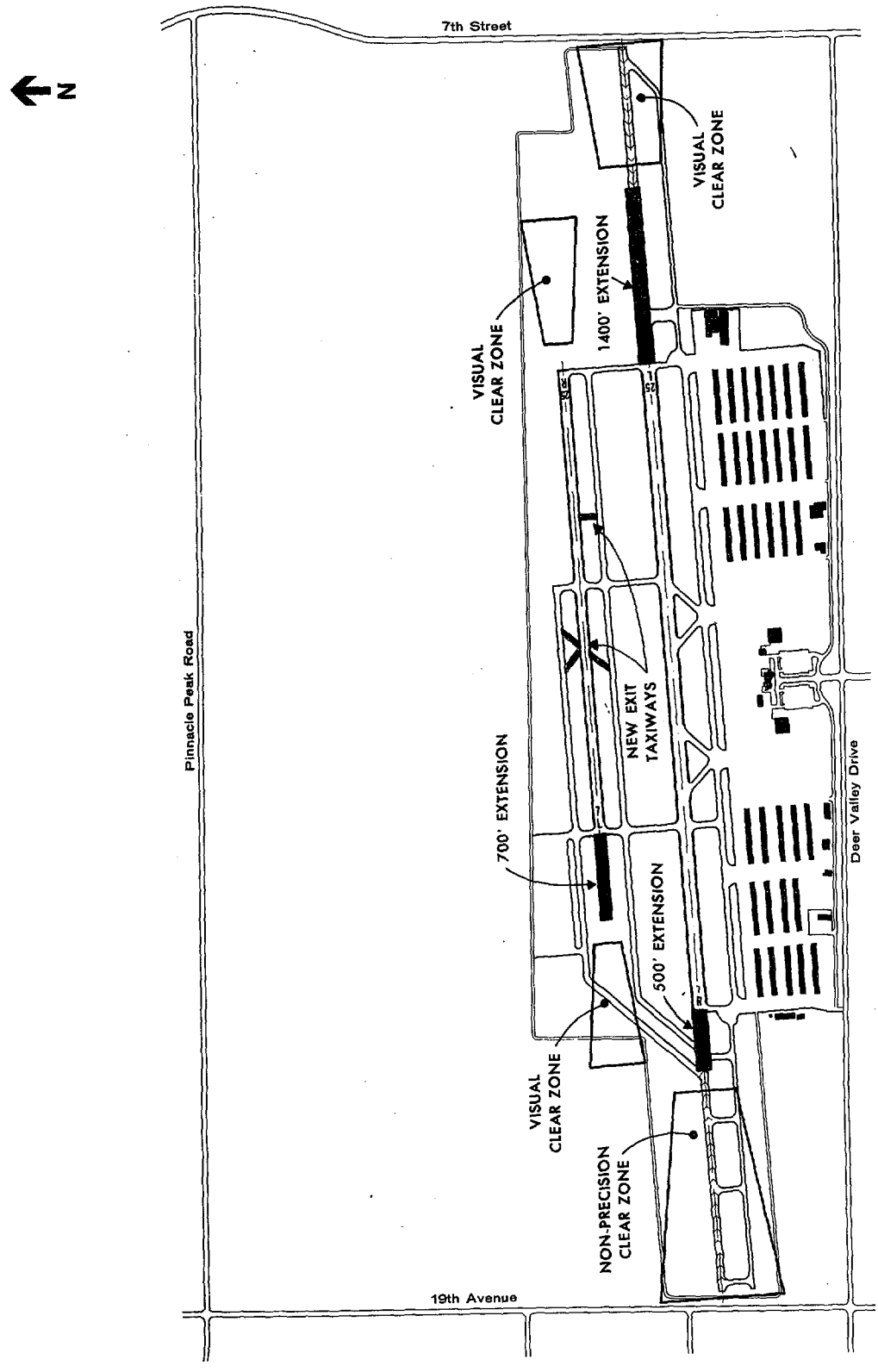
3. environmental considerations.

The advantages and disadvantages of each concept with respect to each of the factors are summarized in the following text. The no-build alternative (Concept C) was not considered to be a reasonable alternative if forecast aviation activity is to be accommodated. The four remaining concepts would be clearly superior in terms of attracting business aviation activity to the airport.

AIRFIELD CONCEPT B

FIGURE 6-4

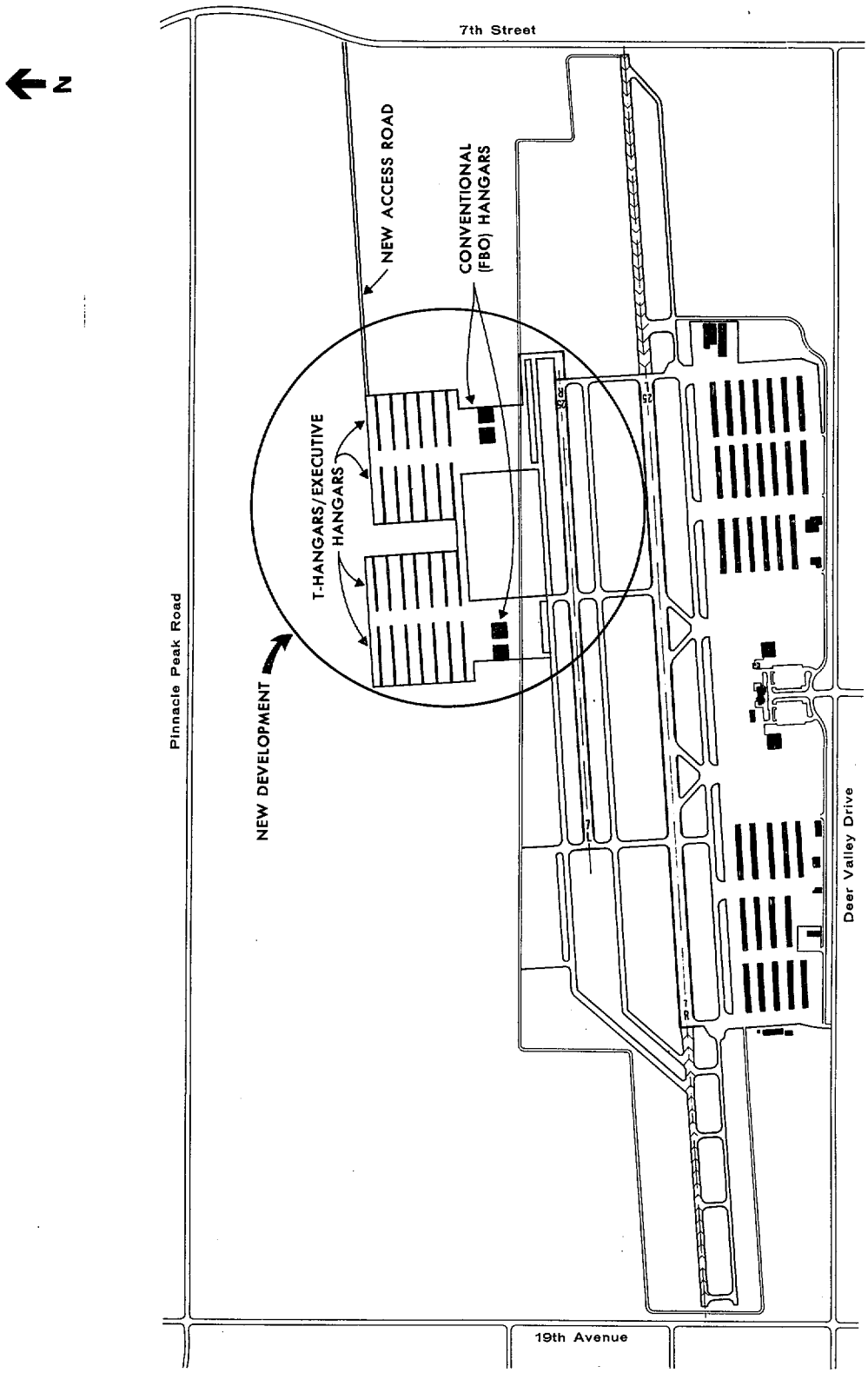
PHOENIX–DEER VALLEY MUNICIPAL AIRPORT



HANGAR CONCEPT 1

FIGURE 6-5

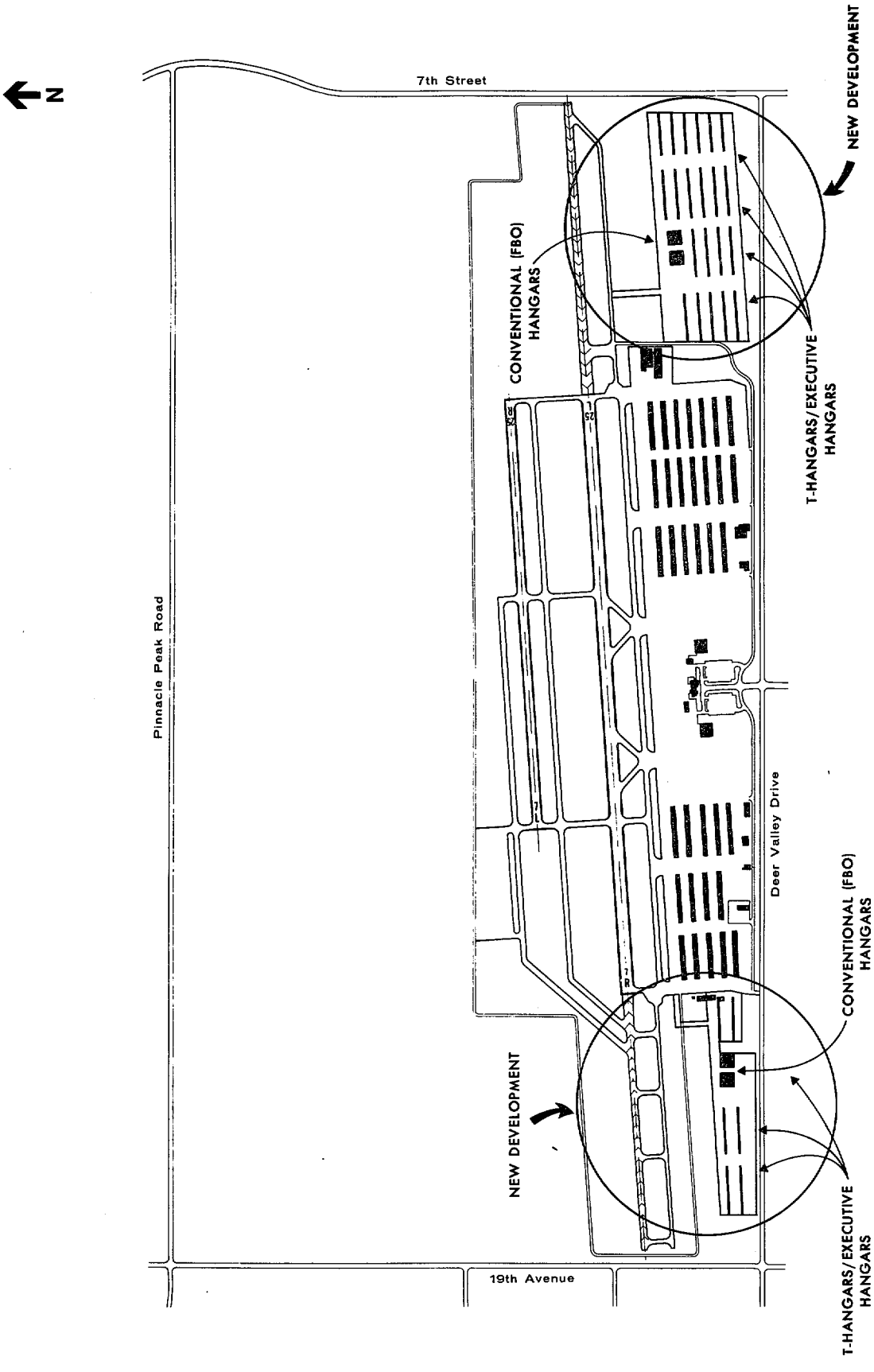
PHOENIX–DEER VALLEY MUNICIPAL AIRPORT



HANGAR CONCEPT 2

FIGURE 6-6

PHOENIX–DEER VALLEY MUNICIPAL AIRPORT



In comparing the "A" series airfield concepts (A-1, A-2, A-3) to Concept B, the principal difference is that Concept B provides only a runway length of 7200 feet on Runway 7R-25L. This length, when compared to the 8200 feet in the "A" concepts, does not meet the needs of departing business jets when air temperatures exceed 96°F, which is a very common occurrence at the airport. Therefore, Concept B provides a lesser level of service than the "A" concepts and is a less desirable alternative.

In assessing the "A" concepts, improvements to Runway 7R-25L vary only in the extent of displaced thresholds provided on both runway ends. In Concept A-1, no displaced thresholds are used, and as a result, the non-precision clear zone at the west end of the runway extends 910 feet across 19th Avenue. This situation is not desirable, since the required airport control or ownership of the property in this area would be expensive to achieve.

Concepts A-2 and A-3 utilize the same 910-foot displaced threshold on the west end of Runway 7R-25L. The east end of the runway is treated differently in the two alternatives. In Concept A-2, the visual clear zone remains on airport property without a displaced threshold. With Concept A-3, a displaced threshold of 930 feet is utilized so that a non-precision approach clear zone can be contained wholly on airport property. In assessing the relative advantages of these two options for Runway 25L instrumentation, it is anticipated that a new approach to Runway 7R using a NAVAID such as a TVOR would also allow for the establishment of a new non-precision approach to Runway 25L, which would reduce current conflicts with Scottsdale using the existing NDB approach. The new aproach to 25L would not have minima as low as the new 7R approach, due to the higher terrain east of the airport, but would provide some utility for instrument approaches. For these reasons, Concept A-3 is superior to Concept A-2.

With respect to Runway 7L-25R, the principal difference among the "A" concepts is that with A-2, the full 700-foot extension of the runway is to the west, in the opposite direction of the high terrain east of the airport. The resultant west clear zone would extend 250 feet off airport property, requiring additional land acquisition. However, the City intends to acquire this property to control the land between the runway end and 19th Avenue, an acquisition which would enhance compatibility with airport operations. Concepts A-1 and A-3 provide for an extension of the runway by 450 feet west, with the remainder of the extension (250 feet) to the east. The eastward extension would result in aircraft altitudes 7-12 feet lower on approach to Runway 25R.

In summary, Concept A-3 provides the best development options for Runway 7R-25L while Concept A-2 provides the best option for Runway 7L-25R. If acquisition of land west of Runway 7L-25R is not feasible, the recommended airfield concept can be modified to include the north runway improvements of Concept A-3.

Evaluation of Hangar Development Concepts

An evaluation of the two basic concepts for future hangar development was completed taking into consideration three general evaluation factors:

1. operational efficiency,
2. capital costs, and
3. flexibility to meet changes in airport activity growth.

The advantages and disadvantages of each of the hangar concepts are summarized. Concept 1 opens up a new area for airport development on the north side of the field. This split of hangar facilities would provide a good balance of facilities on the airport, in that aircraft in the north area would use the north runway while aircraft in existing facilities could use the south runway. With 40 percent of the airport's hangars located in the north area by the year 2005, the balance between runway operations would be excellent, with crossings of active runways by aircraft taxiing to and from hangar facilities minimized. Expansion beyond the year 2005, if needed, could be accommodated in the new north area, since a total area of 175 acres would be available.

In Hangar Concept 2, all of the airport facilities would be on the south side of Runway 7R-25L. This would require the acquisition of 90 acres of relatively expensive land, in which all of the new facilities would be located. Since all of the new area to the south would have to be developed to accommodate forecast demand through 2005, there would be no surplus areas for future construction of additional facilities if needed. Also, because of the concentration of facilities on the south side of the airport, 100,000 to 150,000 annual crossings of Runway 7R-25L by taxiing aircraft would be required to balance operations on the airport's two parallel runways. This situation would not be desirable from either an operational or safety perspective.

For the reasons stated above, Hangar Concept 1 is clearly considered to be the most favorable option.

Recommended Airport Development Concept

The major airfield improvements associated with Airfield Concept A-3, with the north runway improvements of Concept A-2, and the hangar development scheme outlined in Hangar Concept 1 were combined to become the Recommended Airport Development Concept. This concept serves as the basis for the development of the updated Airprot Layout Plan, which is presented in narrative and graphical form in the following section.

b. Detailing of Updated Airport Layout Plan

The major improvements included in the recommended airport development concept were incorporated into the updated Airport Layout Plan. The ALP set consists of a series of eight drawings, as follows:

Sheet 1. Title Sheet
Sheet 2. Airport Layout Plan
Sheet 3. General Aviation Terminal Area Plan

Sheet 4. Part 77 Imaginary Surfaces, Runway and Approach Surface Plans and Profiles
Sheet 5. Runway 7L and 7R Approach Surfaces
Sheet 6. Runway 25L and 25R Approach Surfaces
Sheet 7. On-Airport Land Use Plan
Sheet 8. Off-Airport Land Use Plan

Each of these plans is discussed in this section of the report, with accompanying reduced scale versions of some of the 24 inch x 36 inch plans provided.

Airport Layout Plan

The updated Airport Layout Plan, which is Sheet 2 of the ALP Set, is presented in Figure 6-7.

Runways. To acommodate the 8,200-foot length for Runway 7R-25L outlined in Chapter 5, it was determined that a west extension of 1330 feet could be accommodated, and an east extension of 1570 feet. This would provide for an ultimate length of 8200 feet while enabling proper runway safety areas to be maintained. The extension on the west end will include a 910-foot displaced threshold, with a 930-foot displaced threshold on the east end. The displacements will allow the proposed runway clear zones to remain within current airport property limits. The width of the runway extensions will be the same as the existing runway width, 100 feet.

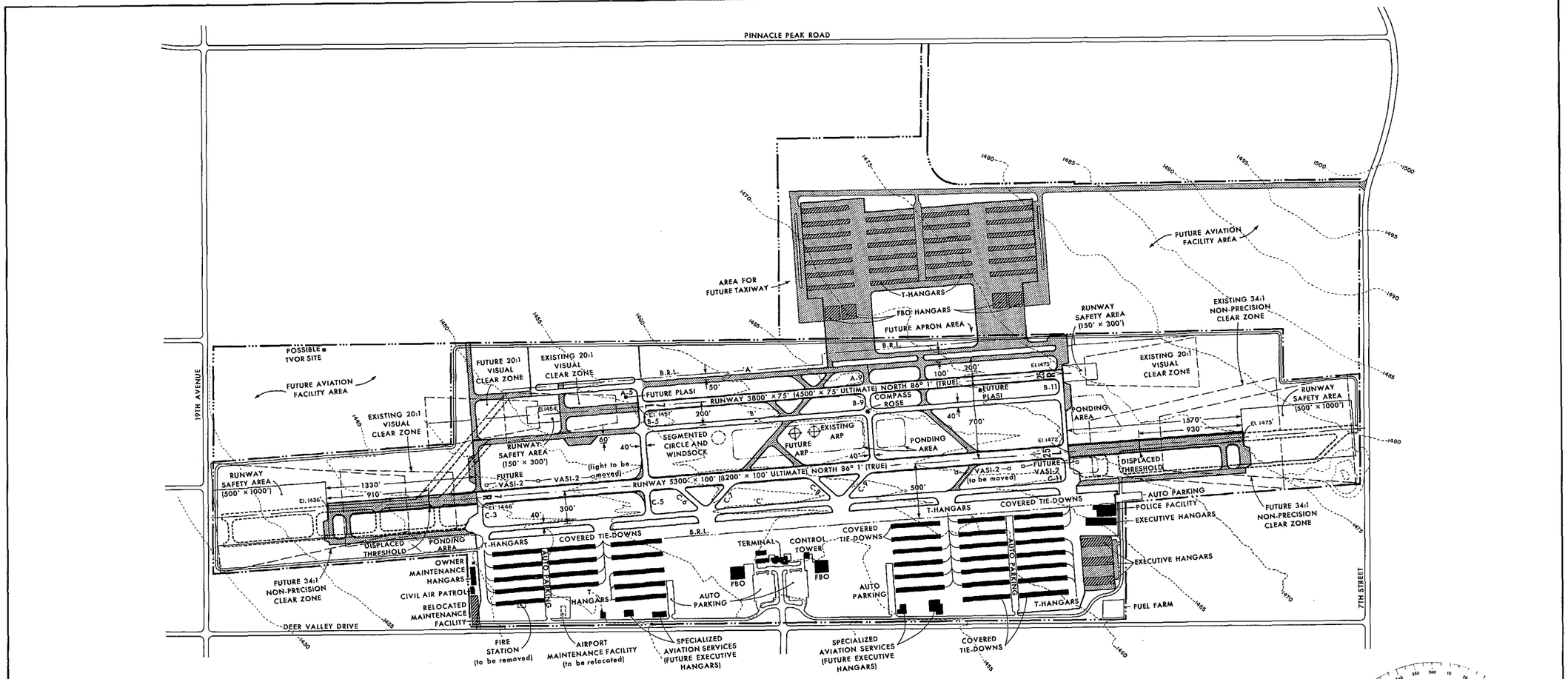
Runway 7L-25R will be extended from its current length of 3800 feet to 4500 feet, with the full extension made on the west end of the runway, at a width of 75 feet.

Taxiways and Holding Aprons. The parallel taxiway south of Runway 7R-25L, which is spaced 300 feet, centerline to centerline, from the runway, will be extended along the entire length of the proposed runway extensions (2900 feet) with a connector and bypass taxiway provided at each end of the runway. The old taxiway pavement parallel to the existing runway overruns should be removed when the new taxiway sections are constructed. In addition, a new angled exit taxiway is proposed between Runway 7R-25L and the south parallel taxiway 1500 feet from the new Runway 25L displaced threshold. Finally, fillets will be added at the intersection of Runway 7R-25L and Taxiway C-5, both to the north and south, to aid aircraft landing on Runway 7R and exiting at this location. These taxiways will provide greatly enhanced traffic flows to the south ramp area.

The north parallel taxiway (A) will be extended to the east end of Runway 7L-25R, with a connection made to the Runway 25R threshold. In addition, a parallel apron edge taxiway north of this taxiway (100 feet centerline to centerline) is planned to serve the new north hangar area. On the west end of the runway, new connector taxiways will be required between the new Runway 7L threshold and Taxiways A and B. Taxiways A and B will be extended westward to connect into a new north/south taxiway between Runway 7R and the Emkay development north of the airport.

Airport Layout Plan

Figure 6-7

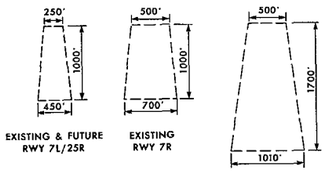


Basic Data Tables

RUNWAY DATA TABLE	RUNWAY 7L/25R		RUNWAY 7R/25L	
	EXISTING	ULTIMATE	EXISTING	ULTIMATE
RUNWAY LENGTH	3800'	4500'	5300'	8200'
RUNWAY WIDTH	75	SAME	100'	SAME
EFFECTIVE GRADIENT (%)	.48	.47	.49	.48
% WIND COVERAGE @ 12 MPH / @ 15 MPH	98.2 / 99.4	SAME / SAME	98.2 / 99.4	SAME / SAME
INSTRUMENT RUNWAY	NO	NO	YES	YES
PAVEMENT STRENGTH SINGLE / DUAL / DUAL TANDEM	20,000 lbs. / — / —	SAME	40,000 lbs / 50,000 lbs / 80,000 lbs	SAME / SAME / SAME
APPROACH SURFACES	(7L) 20:1 (25R) 20:1	(7L) SAME (25R) SAME	(7R) 20:1 (25L) 34:1	(7R) 34:1 (25L) SAME
RUNWAY LIGHTING	NONE	MIRL		SAME
APPROACH AIDS	(7L) — (25R) —	(7L) PLASI, REIL (25R) PLASI, REIL	(7R) VASI-2, REIL (25L) VASI-2, REIL, MDB	(7R) VASI-2, REIL, VOR (25L) VASI-2, REIL, VOR
RUNWAY END COORDINATES	(7L) LATITUDE 33°41'23" LONGITUDE 112°5'12" STATE COORDINATES 13549 N 13886 E	(7L) LATITUDE SAME LONGITUDE 112°5'20" STATE COORDINATES 11999 N 13176 E	(7R) LATITUDE 33°41'13" LONGITUDE 112°5'31" STATE COORDINATES 11229 N 12436 E	(7R) LATITUDE 33°41'14" LONGITUDE 112°5'45" STATE COORDINATES 11149 N 11106 E
	(25R) LATITUDE 33°41'29" LONGITUDE 112°5'37" STATE COORDINATES 12309 N 13676 E	(25R) LATITUDE SAME LONGITUDE SAME STATE COORDINATES SAME SAME	(25L) LATITUDE 33°41'19" LONGITUDE 112°5'37" STATE COORDINATES 11604 N 12731 E	(25L) LATITUDE 33°41'20" LONGITUDE 112°5'38" STATE COORDINATES 11714 N 11276 E

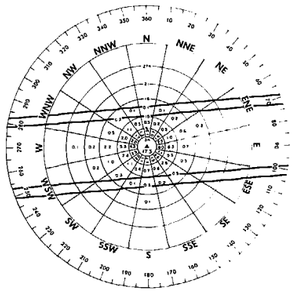
AIRPORT DATA TABLE	EXISTING	ULTIMATE
AIRPORT ELEVATION	1475' MSL	SAME
AIRPORT REFERENCE POINT (ARP) LATITUDE / LONGITUDE / STATE COORDINATES	33° 41' 18" N / 112° 06' 54" W / 15,804 N / 15,446 E	33° 41' 17" N / 112° 06' 52" W / 11,789 N / 15,370 E
MEAN MAXIMUM TEMPERATURE	106° F	SAME
AIRPORT TERMINAL AREA NAVAIDS	NONE	TVOR
TAXIWAY LIGHTING	SOME	ALL

CLEAR ZONE DIMENSIONS



CLEAR ZONES START 200' FROM RUNWAY ENDS OR DISPLACED THRESHOLDS (SCALE 1"=800')

NOTE: TAXIWAY DESIGNATORS SHOWN ARE EXISTING (1985).



SOURCE: PHOENIX SKY HARBOR INTERNATIONAL AIRPORT

PERIOD: 1965-1974 NATIONAL CLIMATIC CENTER

COVERAGE WITH MAXIMUM 12 MPH CROSSWIND COMPONENT =98.2%

15 MPH CROSSWIND COMPONENT =99.4%

Legend

- Existing Pavement
- Future Pavement
- Existing Buildings
- Future Buildings
- Existing Airport Property Line & Fence
- Future Airport Property Line & Fence
- Pavement to be Removed
- Buildings to be Removed

N

0 400 800 1200

Scale in Feet

Funding Acknowledgment

The preparation of this document was financed in part through an Airport Master Planning Grant from the Department of Transportation, Federal Aviation Administration (FAA), under provisions of the Airport and Airway Improvement Act of 1982, and with the financial support of the City of Phoenix.

Item	Date

Approval

AIRPORTS DIRECTOR CITY OF PHOENIX	DATE
AIRPORT DEVELOPMENT ENG. CITY OF PHOENIX	DATE
FEDERAL AVIATION ADMINISTRATION	DATE

Phoenix-Deer Valley Municipal Airport Master Plan

Airport Layout Plan

Howard Needles Tammen & Bergendoff

Additional exit taxiways proposed on the ALP include two angled and one right-angled exits between Runway 7L-25R and Taxiway A, and two angled and one right-angled taxiway between Runway 7L-25R and Taxiway B.

To improve traffic flows between the north and south areas of the airport, three additional taxiways are recommended between Runway 7R-25L and Taxiway B. These taxiways are shown on the ALP as part of the future optimized taxiway system. Finally, an area for a future taxiway to the State land to the north of the airport is shown west of the new hangar area.

New holding aprons are proposed north and south of both ends of Runway 7L-25R, and on the connector taxiways at both ends of Runway 7R-25L. In the case of Runway 7L, the holding apron on the north side will be established on the existing apron. The holding aprons should be sized based on the number of aircraft to be accommodated. (The holding aprons shown on the ALP will each handle 4-5 aircraft.)

Navigational and Landings Aids and Lighting. The only new instrument landing aid planned for the airport is one to be used for a non-precision approach to Runway 7R. A TVOR would be the most useful form of aid, located near the Runway 7R threshold. This aid would serve a secondary benefit as a fix for aircraft navigating to the Airport from as far as 25 miles away. A third benefit would be that an instrument approach to Runway 25L could be established in the future using the same TVOR. Using siting criteria set forth in FAA AC 150/5300-2D, Site Requirements for Terminal Navigational Facilities, a potential site for a TVOR was identified on the ALP in the northwest corner of the airport.

An alternative instrument aid would be a localizer sited to serve Runway 7R approaches. The antenna would be sited off the east end of the runway, and would provide more precise guidance to aircraft on approach. The localizer would not have the secondary benefits that are associated with the TVOR.

New landing aids recommended for the airport include some form of visual approach slope aids on both ends of Runway 7L-25R (PLASI's shown on ALP) and Runway End Identifier Lights (REIL) on the same two runway ends. In addition, the VASI-2 installations on Runway 7R-25L will need to be relocated to provide proper guidance to the new displaced thresholds.

With regard to airfield lighting, it is recommended that all newly constructed runway extensions be provided with Medium Intensity Runway Lights (MIRL). In addition, lighting of Runway 7L-25R with MIRLs should proceed as currently programmed by the City. All new taxiways should be provided with edge lighting when constructed, and currently unlit taxiways which directly serve runways and major taxiways should also be lit.

Runway Clear Zones, Safety Areas and Building Restriction Lines. Three of the four existing runway clear zones will change with implementation of the new ALP. The visual clear zone to Runway 7R will be replaced by a new non-precision clear zone located at the proposed displaced threshold. The existing non-precision clear zone at the Runway 25L threshold will be

shifted to that runway's proposed displaced threshold. On Runway 7L-25R, the visual clear zone to Runway 7L will be shifted west to the new runway end.

A 500-foot wide Runway Safety Area (250 feet from the centerline on both sides) should be maintained along the entire length of Runway 7R-25L and 1000 feet beyond the physical ends of the extended runway. The standard runway safety area should be graded and free of structures, ditches, soft spots, and ponding areas. However, subsurface drainage, covered culverts, underground structures, gentle drainage swales, and frangibly mounted air navigational aids, which because of their function require location in the runway safety area, may be permitted. Security fencing must be located outside of the runway safety area. Traverse ways (roadways, railroads, and waterways), except those provided for fire-fighting and rescue equipment, should be excluded from the runway safety area. All objects, which because of their function must be maintained within the runway safety area, should be constructed with frangible supports and be of minimum practical height.

The existing unused pavement could either be retained in the areas off the runway ends or removed to avoid the need for continued maintenance, with the area graded to FAA standards. With the existing physical characteristics of the two areas, very little work will be required to meet safety area standards off the runway ends. On the north side of the runway, reconfiguration or elimination of the retention basins is needed to meet safety area standards. A project currently programmed by the City to build underground drainage pipes to replace the retention basin would be ideal and should be accomplished.

On Runway 7L-25R, 150 foot-wide and 300-foot-long safety areas should be maintained off the runway ends. Again, the existing topography will enable safety areas to be maintained without substantial work.

A Building Restriction Line (BRL) 500 feet south of Runway 7R-25L will be maintained for future airport development. FAR Part 77 should be consulted before any structures beyond the 500-foot limit are constructed to ensure compatability with air navigation. No buildings should be permitted to be constructed between Runway 7R-25L and Runway 7L-25R. North of Runway 7L-25R, a 250-foot-wide BRL should be maintained. Again, FAR Part 77 should be checked before approval is given for buildings north of the BRL.

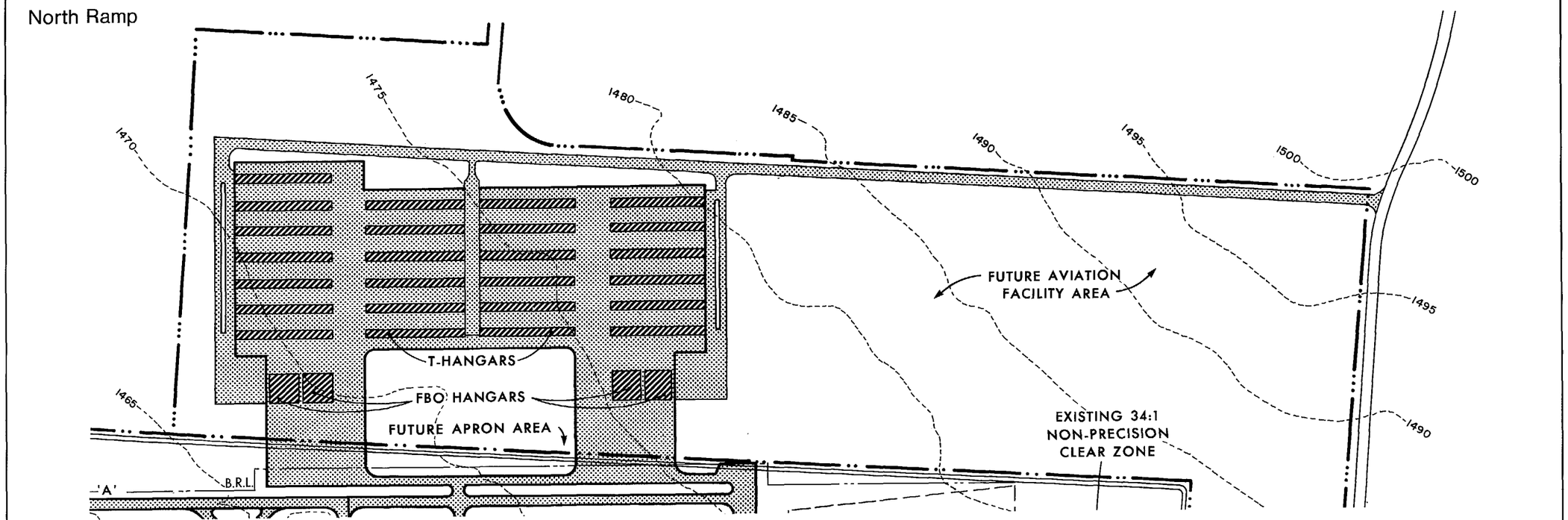
Hangars, Covered Tie-Downs and Aircraft Aprons. Sixty-seven new T-hangars and 181 new covered tie-downs are planned for construction on the south ramp area in 1985. The location of these facilities are shown on the ALP and on the more detailed General Aviation Terminal Area Plan (Figure 6-8). Beyond 1985, additional executive hangar development can be accommodated south of the existing executive hangars at the east end of the ramp. This development would use all remaining vacant areas on the south ramp for hangar facilities.

The envisioned development of the North Ramp area also is depicted on the ALP and on the General Aviation Terminal Area Plan. By the year 2005, areas for two additional FBO facilities are indicated in this area, with each facility including two 15,000-square-foot conventional hangars, ramp

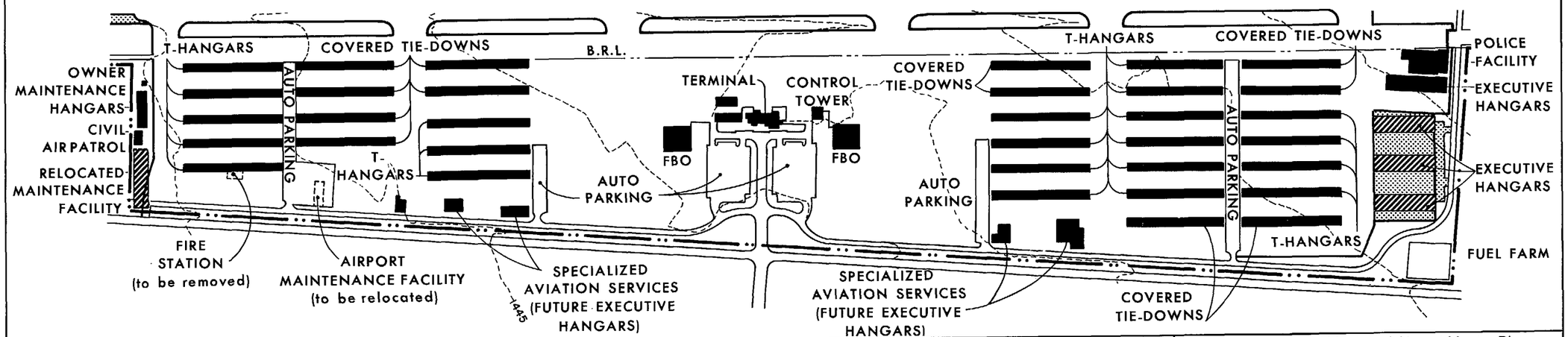
General Aviation Terminal Area Plan

Figure 6-8

North Ramp



South Ramp



Legend

- Existing Pavement
- Future Pavement
- Existing Buildings
- Future Buildings

N

0 200 400 600

Scale in Feet

Funding Acknowledgment

The preparation of this document was financed in part through an Airport Master Planning Grant from the Department of Transportation, Federal Aviation Administration (FAA), under provisions of the Airport and Airway Improvement Act of 1982, and with the financial support of the City of Phoenix.

Revision

Item	Date

Phoenix-Deer Valley Municipal Airport Master Plan

General Aviation Terminal Area Plan

Howard Needles Tammen & Bergendoff

space, and automobile parking facilities. In addition, a possible layout for 380 additional T-hangar units is depicted in the North Ramp area, with convenient automobile parking and ground access shown. An area of 58,000 square yards between the two FBO facilities would be available for additional ramp space or other facilities, if needed. In the long term, an additional 75 acres east of the proposed North Ramp and 25 acres in the northwest corner of the airport would be available for the development of new facilities.

Land Acquisition. The existing airport property includes an area of approximately 482 acres, as outlined on the ALP. Additional property will be required in the future for two principal purposes: expanded airport facilities, and the continued compatability of airport operations with surrounding land uses.

The accommodation of future airport facilities will be provided through purchase from the State of Arizona of a 175-acre parcel of land north and east of Runway 7L-25R. The acreage will provide ample space for facilities programmed through the year 2005, plus additional facilities, if needed, to accommodate greater than forecast growth and/or demand beyond 2005.

In order for the airport to retain good compatability between operations on Runway 7L-25R and land uses directly under the approach and departure paths to the runway, additional land acquisition is recommended. Operations on the runway are expected to increase from roughly 120,000 in 1984 to 300,000 by 1997. This equates to an average of 800 daily overflights of the land east or west of the runway on a given day. The acquisition of the 46-acre parcel between the existing property line and 19th Avenue to the west, and the 7-acre parcel between the existing property line and 7th Street to the east, will enhance future land use compatability. In addition, smoke, dust, lights and other aspects of future development in these areas could potentially interfere with the safe operation of aircraft to and from the runway. For these reasons, acquisition of these properties is recommended.

The acquisition of the three new areas described would bring the total area of the airport to approximately 710 acres.

New Airport Maintenance Facility. A new airport maintenance facility is needed to replace the old facility at the west end of the south ramp. With most of the ground traffic to a new facility orignating from the area of the terminal building on the south ramp, and utilities readily available, a new facility would be best located on the south side of the airport. After a review of potential sites was made with City staff, a site just to the south of the Civil Air Patrol building, on the west edge of the south ramp, was selected. This location, shown on the ALP, would be available for immediate development, whereas work on a site to the north would need to await property acquisition and/or the provision of utilities.

Removal of Airfield Pavement. The ultimate development of the airfield should include the removal of abandoned pavements, to reduce annual maintenance costs and to eliminate confusion as to which pavements are

active. The pavements to be removed, shown on the ALP, generally include the portions of the old runway and taxiways extending beyond the proposed 8200-foot Runway 7R-25L.

General Aviation Terminal Area Plan

The north ramp and south ramp activity areas depicted on the ALP have been enlarged and detailed on a separate General Aviation Terminal Area Plan, presented as Sheet 3 of the ALP (Figure 6-8). The detailing includes existing and proposed locations of hangars, ramp areas, covered tie-downs, auto parking, and access facilities.

Part 77 Imaginary Surfaces and Runway and Approach Surface Plans and Profiles

Sheet 4 of the Airport Layout Plan (Figure 6-9) shows the projection of imaginary airspace obstruction identification surfaces in the immediate vicinity of the airport. The application and dimensioning of these surfaces is prescribed in Part 77 of the Federal Aviation Regulations (FAR). A flat, primary surface lies along either side of the runway and extends 200 feet off each end of the runway. Depending upon the type of approach to the runway, these surfaces at Deer Valley are 250 or 500 feet wide. At the end of each primary surface a trapezoidal approach surface begins. Again, depending upon the type of approach to the runway, the slope of this surface varies from 20:1 (twenty feet horizontal for every foot vertical) for visual approaches, to 34:1 for non-precision approaches.

The horizontal surface is located 150 feet above the established airport elevation; at Deer Valley, this is 1625 feet. The extent of this surface is determined by 10,000-foot radius arcs drawn from each primarly surface end (5000 feet for visual runway ends). The arcs are then joined by tangents to form the outer boundaries of the surface. Starting at the end of these boundaries is the conical surface which rises outward at 20:1 slope.

Transitional surfaces of a 7:1 slope connects the sides of the primary surfaces and approach surfaces with the horizontal surface.

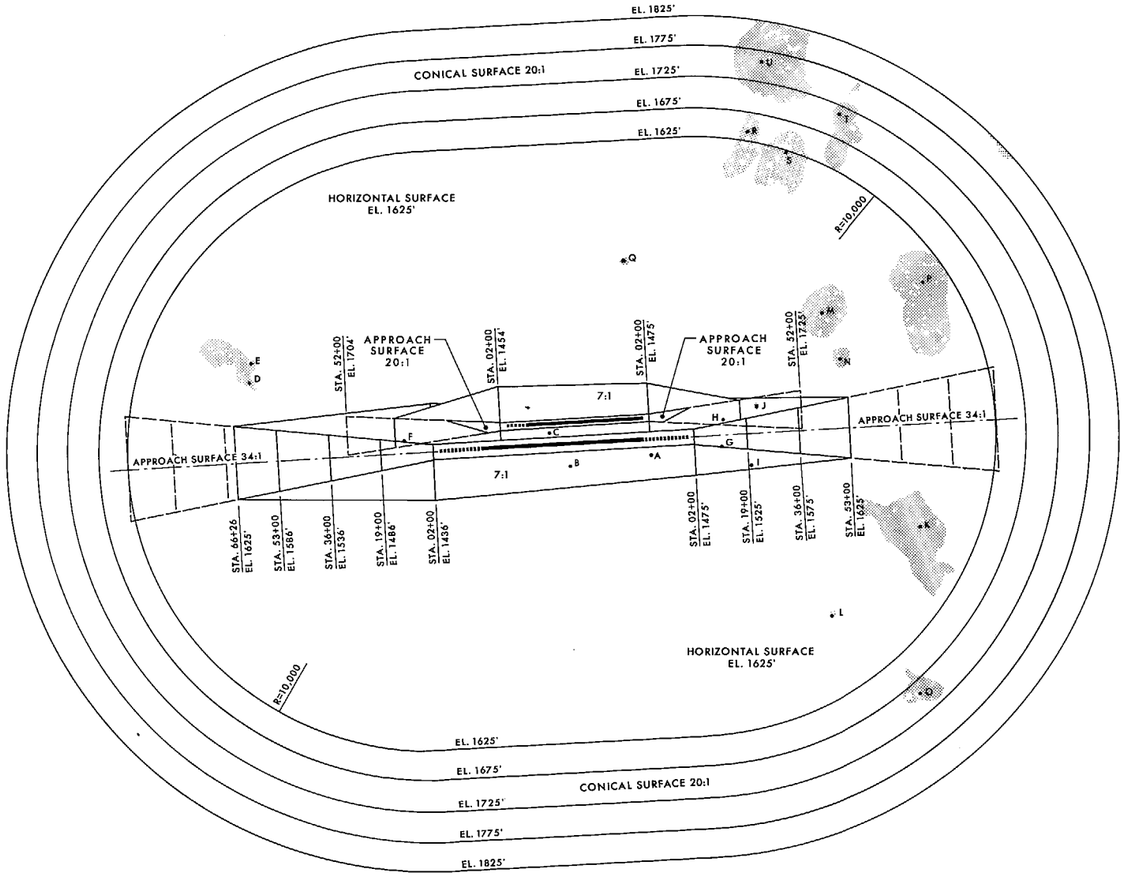
The illustration of these surfaces, as applied to Deer Valley, shows the surfaces that are height critical with solid lines, and the full extent of other surfaces with dashed lines. These surfaces are the principal bases for height zoning in the airport vicinity, which is described in detail in Chapter 8 of this report.

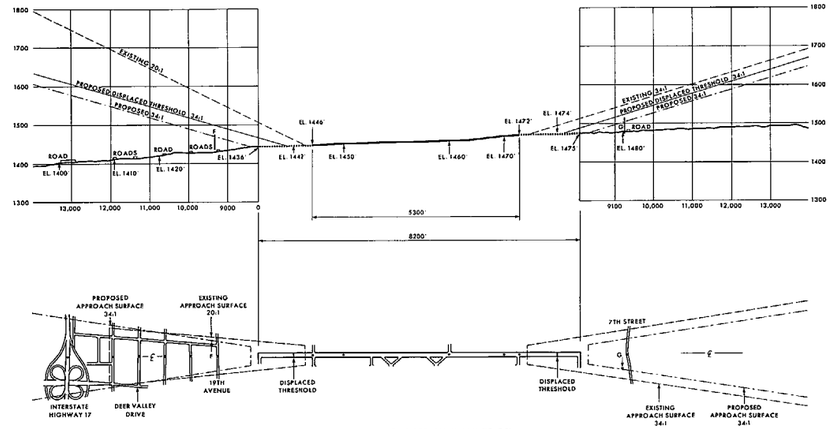
The principal obstructions to air navigation identified by application of the Part 77 surfaces are listed on Sheet 4. Generally, they include numerous hills in the airport vicinity, some of which have obstruction lights, but most of which do not.

Also presented on Sheet 4 are plans and profiles of the airport's two runways, together with the inner portions on their existing and proposed approach surfaces. The profiles are also shown for the proposed displaced thresholds to Runways 7R and 25L.

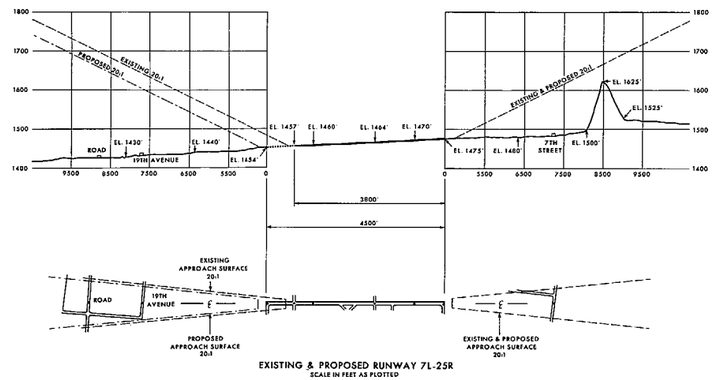
Part 77 Imaginary Surfaces and Runway and Approach Surface Plans and Profiles

Figure 6-9





EXISTING & PROPOSED RUNWAY 7R-25L
SCALE IN FEET AS PLOTTED



EXISTING & PROPOSED RUNWAY 7L-25R
SCALE IN FEET AS PLOTTED

POINT	DESCRIPTION	DISTANCE FROM ℄ OF 7R-25L	HEIGHT (MSL)	HEIGHT OF PART 77 SURFACE	PENETRATION	ACTION TO BE TAKEN
A	POLICE HANGAR	510'	1498'	1512'	0'	NONE
B	CONTROL TOWER (ANTENNAE)	735'	1532'	1527'	5'	NONE
C	WIND SOCK	365'		1473'	0'	NONE
D	OBSTRUCTION LIGHT ON HILL	2700'	1679'	1625'	54'	NONE
E	OBSTRUCTION LIGHT ON HILL	3190'	1711'	1625'	86'	NONE
F	STREET LIGHT	400'	1468'	1462'	6'	LIGHT
G	POLE ON HILL	380'	1526'	1503'	23'	LIGHT
H	UTILITY POLE	505'	1514'	1519'	0'	NONE
I	OBSTRUCTION LIGHT ON HILL	1050'	1587'	1609'	0'	NONE
J	OBSTRUCTION LIGHT ON HILL	850'	1642'	1577'	65'	NONE
K	OBSTRUCTION LIGHT ON HILL	3380'	2083'	1625'	458'	NONE
L	GROUND	6200'	1646'	1625'	21'	NONE
M	GROUND	3850'	1927'	1625'	302'	LIGHT
N	GROUND	2220'	1700'	1625'	75'	NONE
O	GROUND	8850'	1826'	1695'	131'	NONE
P	GROUND	4700'	1943'	1625'	318'	NONE
Q	GROUND	5950'	1628'	1625'	3'	NONE
R	GROUND	9900'	1800'	1633'	167'	NONE
S	GROUND	9180'	1811'	1625'	186'	NONE
T	GROUND	10,380'	1875'	1711'	164'	NONE
U	GROUND	12,280'	2111'	1758'	353'	NONE

NOTE: OBSTRUCTION DATA DERIVED FROM AS-BUILT DRAWINGS AND FIELD MEASUREMENTS BY HNTB, JANUARY 1985

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Revision

Item	Date

Phoenix-Deer Valley Municipal Airport Master Plan

Part 77 Imaginary Surfaces, Runway and Approach Surface Plans and Profiles

Howard Needles Tammen & Bergendoff

Runway Approach Surfaces. Large scale drawings of the full approach surfaces to Runways 7L and 7R (Sheet 5) and Runways 25L and 25R (Sheet 6) are included in the ALP set. These drawings are superimposed on 1984 aerial photographs for use in locating specific areas within each of the surfaces.

On-Airport Land Use Plan. Sheet 7 of the ALP presents general uses of existing and planned land areas within the ultimate airport property line. The depicted land use categories, which are superimposed on a 1984 airport photo, include airfield development areas (only runways, taxiways, and Navaids permitted), terminal and administration areas, existing aviation facility areas, locations for planned 1986-2005 airport facilities, and areas set aside for aviation facilities beyond the study period (year 2005).

Off-Airport Land Use Plan. Sheet 8 of the ALP set depicts the Recommended Off-Airport Land Use Plan. The plan recommends industrial/-commercial uses on the four sides of the airport, with low intensity development recommended immediately east and west of the runways. The land use recommendations included in the plan are discussed in detail in Chapter 7 of this report.

c. Development Costs and Staging

The individual projects that are included on the Airport Layout Plan for the 1986-2005 planning period were assigned to one of three planning stages, with a preliminary cost estimate attached to each project. The three planning stages are 1986-1990, 1991-1995 and 1996-2005. The assignment of a project to a specific planning period was based on the year that the facility would be needed according to the facility requirement analysis in Chapter 5. For projects not analyzed relative to a specific year, a priority system was used to assign projects to one of the three planning stages. Projects currently planned for construction by the city in 1985 were excluded from the analysis. The total development costs for all stages were estimated to be $37,150,000.

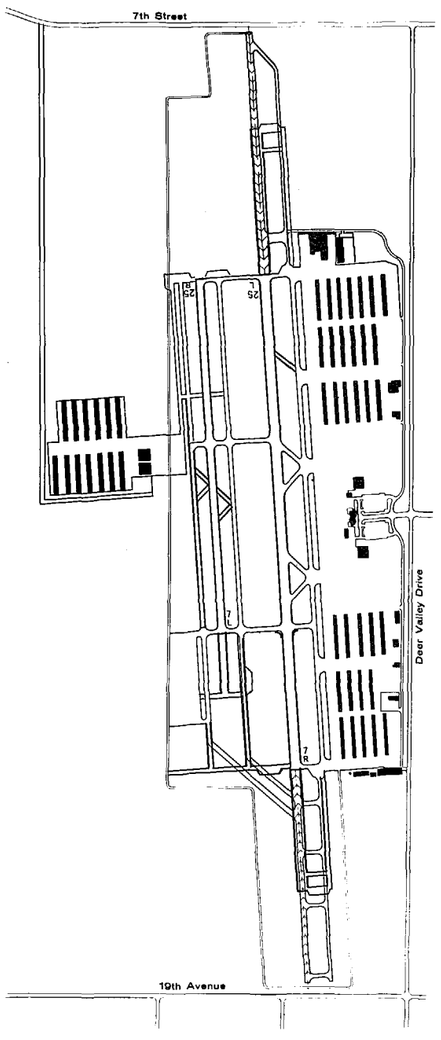
The general staging of facilities is presented graphically in Figure 6-10. A listing of specific projects, with an estimated construction cost in 1985 dollars is shown in Table 6-1. Included in this listing is the maximum amount of FAA funding that could be received for each project under the Airport Improvements Program (AIP) or Facilities and Equipment (F&E) program. Funding for all of the eligible projects is not guaranteed, since the city will have to compete with other airport operators for dollars in the Reliever Airport and Discretionary Funds of the annual AIP appropriation.

DEVELOPMENT PHASING

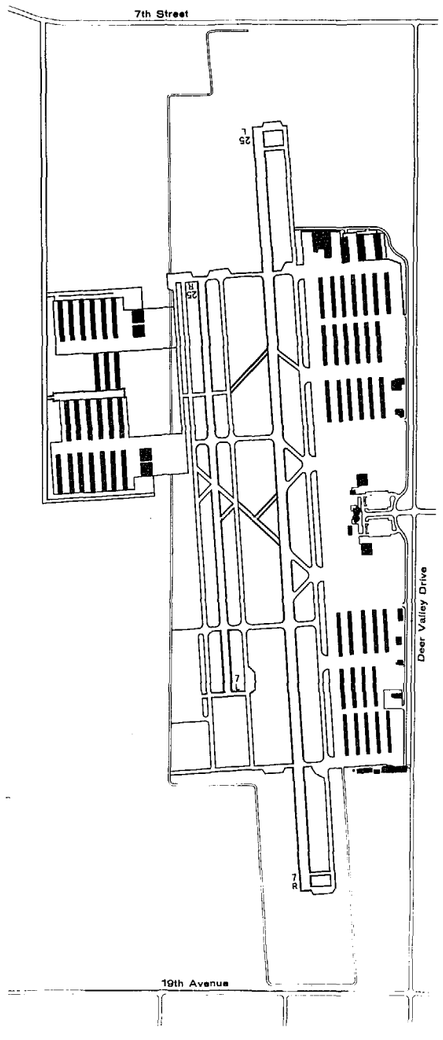
FIGURE 6-10

PHOENIX–DEER VALLEY MUNICIPAL AIRPORT

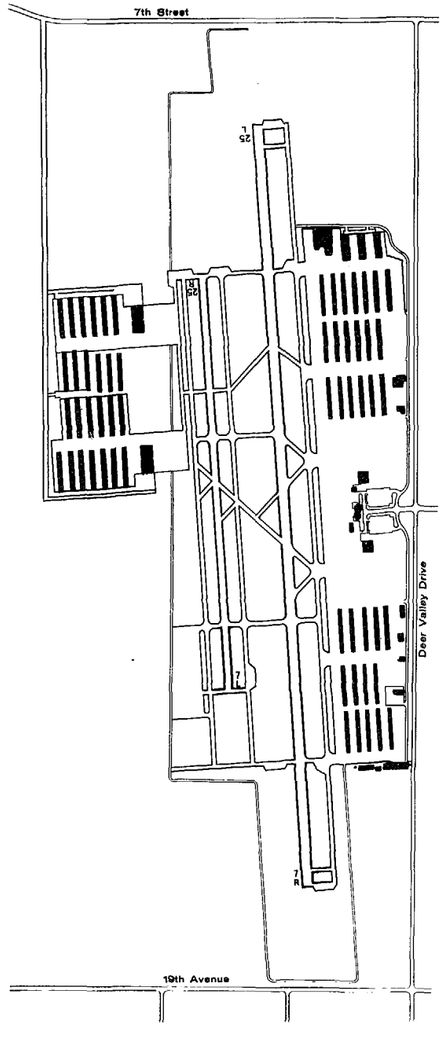
1990



1995



2005



New Buildings

New Pavement

TABLE 6-1
PROJECT STAGING AND COSTS
DEER VALLEY MUNICIPAL AIRPORT

Project	Units	Total Cost	Maximum FAA Share
	1986-1990		
Runway 7R-25L Extension (2900'x100')	32,200 SY	$805,000	$725,000
Taxiway C Extension With Four Connector Taxiways (2900'x40'; 230'x40'x4)	17,000 SY	$425,000	$383,000
Runway 7R-25L Holding Aprons (1350 SYx2)	2,700 SY	$68,000	$61,000
Runway 7L-25R Extension (700'x75')	5,800 SY	$145,000	$131,000
Taxiway A Construction (3750'x40')	16,700 SY	$418,000	$376,000
Connector Taxiways to Runway 7L-25R Ends (142'x40'x3)	1,900 SY	$48,000	$43,000
Runway 7L-25R Holding Aprons (1350 SYx3)	4,100 SY	$103,000	$93,000
Additional Runway 7R-25L Exit Taxiway (300'x40')	1,400 SY	$35,000	$32,000
Additional Runway 7L-25R Exit Taxiways (200'x40'x4) (142'x40'x2)	4,700 SY	$118,000	$106,000
North Ramp Apron and Connector Taxiways	95,000 SY	$1,900,000	$770,000 (45% eligible)**
Taxiway System Connecting Runway 7R and Runway 7L with Emkay Taxiway (3600'x40')	16,000 SY	$400,000	$306,000 (85% eligible)**
South Executive Hangar Ramp	3,000 SY	$60,000	$ 0
FBO Hangars (2)	30,000 SF	$1,500,000	$ 0

TABLE 6-1 (cont'd)
PROJECT STAGING AND COSTS

Project	Units	Total Cost	Maximum FAA Share
T-Hangars	182 units	$2,548,000	$ 0
Executive Hangars	19,000 SF	$950,000	$ 0
Access Road	6,100 LF	$244,000	$220,000
North Ramp Auto Parking	8,000 SY	$80,000	$ 0
Land Acquisition (3 parcels)	228 Ac.	$18,240,000	$16,416,000
New Maintenance Building	Lump Sum	$263,000*	$237,000
TVOR	1 Unit	$105,000*	$105,000
Storm Drainage Improvements	Lump Sum	$300,000*	$284,000
Security Fencing and lighting (3 new parcels)	11,500 LF	$288,000	$259,000
Fuel Storage Facility for North Area	Lump Sum	$150,000*	$ 0
1986-1990 TOTALS	Projects -	$10,953,000	$4,131,000
	Land -	$18,240,000	$16,416,000
		$29,193,000	$20,547,000
1991-1995			
Runway 7R-25L Exit Taxiways to north (3) (550'x40'x2) (340'x40')	6,500 SY	$163,000	$147,000
Pavement Removal (all)	34,000 SY	$60,000	$ 0
South Executive Hangar Ramp	4,500 SY	$90,000	$ 0
Executive Hangars	38,000 SF	$1,900,000	$ 0
FBO Hangars	30,000 SF	$1,500,000	$ 0
T-Hangars	126 units	$1,764,000	$ 0
North Ramp Apron	58,000 SY	$1,160,000	$543,000** (52% eligible)

TABLE 6-1 (cont'd)
PROJECT STAGING AND COSTS

Project	Units	Total Cost	Maximum FAA Share
Access Road	800 SF	$32,000	$29,000
North Ramp Auto Parking	4,400 SY	$44,000	$ 0
1991-1995 TOTALS	Projects -	$6,713,000	$653,000
1996-2005			
North Ramp Apron	23,000 SY	$460,000	$ 0 (0% eligible)**
T-Hangars	70 units	$784,000	$ 0
1996-2005 TOTALS	Projects	$1,244,000	$ 0
TOTAL ALL STAGES (1986-2005)		$37,150,000	$21,200,000

*Phoenix C.I.P. estimate (1985 dollars).
**Areas of ramp for circulation around hangars not eligible for FAA funding.
Note: All runway, taxiway, and apron projects include lighting.